

REVOX®

C 115
Professional
Cassette Tape Deck

Bedienungs- und
Serviceanleitung

Operating and Service
Instructions

Mode d'emploi et
Instructions de Service



Serviceanleitung zu Professional Cassette Tape Deck C 115

DEUTSCH	1. BEDIENUNG	D2
	2. AUSBAU / ZUSAMMENBAU	D8
	3. FUNKTIONSBesCHREIBUNG	D13
	4. ABGLEICHANLEITUNG	D15
	5. TECHNISCHE DATEN	D22

Service instruction for C115 professional cassette tape deck recorder

ENGLISH	1. OPERATING INSTRUCTIONS	E2
	2. ASSEMBLY/DISASSEMBLY	E8
	3. FUNCTIONAL DESCRIPTION	E13
	4. ALIGNMENT INSTRUCTION	E15
	5. TECHNICAL DATA	E22

Manuel de service pour Professional Cassette Tape Deck C 115

FRANÇAIS	1. UTILISATION	F2
	2. DEMONTAGE/ASSEMBLAGE	F8
	3. FONCTIONNEMENT	F13
	4. ALIGNEMENT	F15
	5. CARACTERISTIQUES TECHNIQUES	F22

SCHEMATICS

6.1 PARTS LISTS

6.2 SCHEMATIC DIAGRAMS

TABLE OF CONTENTS

SECT.	TOPIC	PAGE	SECT.	TOPIC	PAGE
1.	OPERATING INSTRUCTIONS	2	4.	ALIGNMENT INSTRUCTIONS	15
1.1	General information	2	4.1	General information	15
1.2	Operator controls	2	4.1.1	Required tools	15
1.3	Display field	5	4.1.2	Demagnetization	15
1.4	Connectors and cabling	5	4.1.3	Level definitions	15
1.5	Operation	6	4.2	Cassette deck alignments	16
1.5.1	Recording	6	4.2.1	Record/reproduce	16
1.5.2	Playback	6	4.2.2	Pinch roller:	17
1.5.3	Selection search	6	4.2.3	Capstan speed alignment	17
1.5.4	MEMO function	6	4.3	Audio alignments	18
1.5.5	Dolby noise reduction	7	4.3.1	Peak meter	18
1.5.6	Calibration	7	4.3.2	Frequency response with tape / MPX-Filter	18
2.	DISASSEMBLY/REASSEMBLY	8	4.3.3	Erase frequency alignment	19
2.1.1	Maintenance	8	4.3.4	Erase and record head adjustment	19
2.1.2	Required tools	8	4.3.5	Playback	20
2.1.3	Reassembly	8	4.3.6	BIAS and REC LEVEL alignment	20
2.2	Disassembly	9	4.4	Measurement of various specifications	21
2.2.1	Housing	9	4.4.1	Distortion with tape	21
2.2.2	Front unit	9	4.4.2	Signal-to-noise ratio with tape	21
2.2.3	Cassette deck assembly	10	4.4.3	Erase depth	21
2.3	Tape transport mechanism	10	4.4.4	Crosstalk	21
2.3.1	Tape guide rollers	10	4.4.5	Wow and flutter	21
2.3.2	Soundheads	10	5.	TECHNICAL DATA	22
2.4	Electrical modules	11			
2.4.1	Mains Unit	11			
2.4.2	Power supply Unit	11			
2.4.3	IN / OUT Unit	12			
2.4.4	Audio board	12			
2.4.5	Front Unit	12			
3.	FUNCTIONAL DESCRIPTION	13			
3.1	Cassette deck	13			
3.2	Control	13			
3.3	Audio electronics	13			

1. OPERATING INSTRUCTION

1.1 General Information

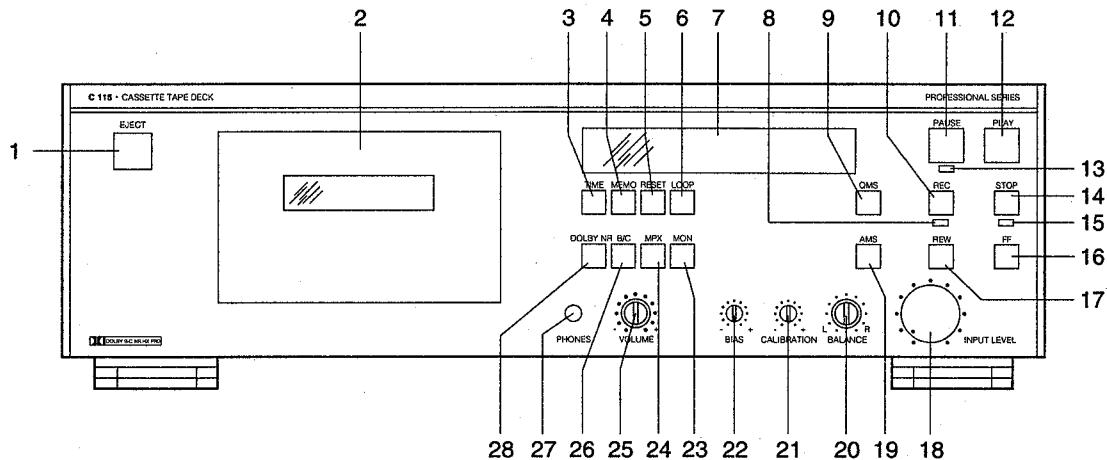
Do not expose the equipment to moisture or humidity, and do not operate the equipment while your hands are wet. Protect the equipment from dust.

Do not expose the equipment to electrostatic discharges and external noise sources.

Do not expose the equipment to direct solar irradiation.

Before you put the equipment into operation for the first time, make sure that the line voltage selector setting matches your local AC line voltage.

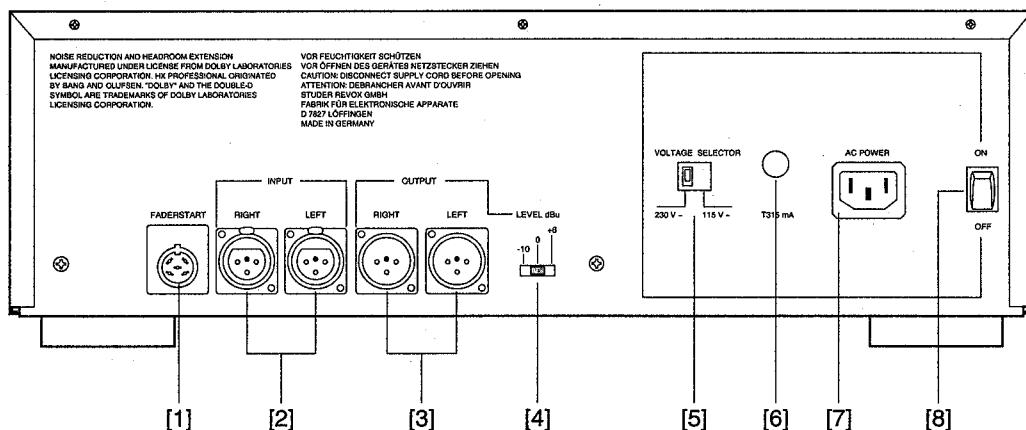
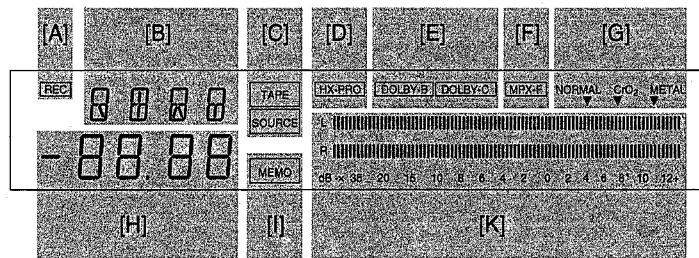
1.2 Operator controls



- | | | | |
|-----------|--|-----------|--|
| [1] EJECT | Opens the cassette compartment | [4] MEMO | Stores a tape address that you subsequently want to search. |
| [2] | Cassette compartment | [5] RESET | Reset key for the tape counter or the elapsed playing time (in the display 7). |
| [3] TIME | Switches the display between tape counter and elapsed playing time indication. | | |

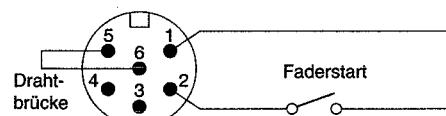
[6] LOOP	Permits repetitive playback of the current selection, provided it is separated by a pause of at least 4 sec.	[21] CALIBRATION	Fine-adjustment for matching the record level to the recorded program source (→ 1.5.6).
[7] DISPLAY	Display field for output level, tape timer and various other functions (->1.3).	[22] BIAS	Fine-adjustment for matching the bias current to the type of cassette being used. (→ 1.5.6)
[8] LED red	This LED is light in REC and REC/PAUSE mode.	[23] MON	Changeover in REC mode between TAPE and SOURCE. The selected mode is shown on the display. In the SOURCE setting the signal from the audio source is heard, whereas in the TAPE setting the just recorded signal is heard. In play mode TAPE is always active.
[9] QMS	Selection of the number for the selection search. (→ 1.5.3)		
[10] REC	Record key; switches the equipment to REC/PAUSE mode. To start the recording press the PAUSE or PLAY key.	[24] MPX	Activates the multiplex filter. This filter should be switched on when FM programs are recorded with DOLBY NR on, and if the pilot tone suppression of the tuner is inadequate.
[11] PAUSE	Pause key; active in record and reproduce mode.		
[12] PLAY	Activates the playback or recording.		
[13] LED yellow	This LED is light in REC/PAUSE mode.	[25] VOLUME	Headphones volume control.
[14] STOP	Cancels all cassette deck functions.	[26] B/C	Changeover between Dolby B and C noise reduction*. For new recording the Dolby C setting should be selected because a better signal-to-noise ratio is achieved than with Dolby B mode. Dolby B should be used for playing back tapes that have been recorded with Dolby B, or for pending recordings to Dolby B tapes.
[15] LED green	This LED is light when a cassette is located in the compartment.		
[16] FF	Fast forward wind of the cassette.		
[17] REW	Fast rewind of the cassette.		
[18] INPUT LEVEL	Record level potentiometer.	[27] PHONES	Headphones jack, diam. 6.3 mm
[19] AMS	Causes all selections to be consecutively played for approx. 10 seconds. To switch to normal play mode press the PLAY key while the tape is still running in AMS mode.	[28] DOLBY NR	Activates the Dolby noise reduction system * (→ 1.5.5).
[20] BALANCE	Balance potentiometer for the record signal.		

* Dolby noise reduction and HX PRO Headroom Extension are manufactured under license of Dolby Laboratories Licensing Corporation. HX PRO has originally been developed by Bang & Olufsen. "DOLBY", the double D symbol and "HX PRO" are registered trademarks of Dolby Laboratories Licensing Corporation.

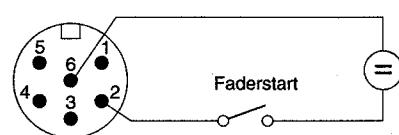


Faderstart socket:

Version 1 With internal supply



Version 2 With external 5...24 VDC supply, and electrically isolated



1.3 Display field

- [A] REC Is light when the unit is switched to record or record pause.
- [B] Numeric peak level indication from 0 to +12 dB in 1 dB steps. If the level exceeds +12 dB, "+dB" is indicated.
Or indication of the operating mode:
STOP, PLAY
FF
REW
PAUSE
RECP
RECm
Ams
P 01...P 15
Playback,
Fast forward,
Fast rewind,
Pause,
Record pause,
Record mute,
AMS playback
QMS mode
- [C] SOURCE/TAPE Identifies the source being heard: tape, source.
- [D] HX PRO The HX PRO System* continually monitors the bias current during the recording process. This improves the dynamic response for high levels and high frequencies. Always active in record mode.
- [E] DOLBY-B
DOLBY-C Indicates the selected noise reduction system.
- [F] MPX-F Indicates whether the MPX filter is switched on or off.
- [G] NORMAL
CrO₂
METAL Indicates the tape type (automatic recognition). The luminous arrow indicates the maximum recommended recording level.
- [H] Elapsed playing time or tape counter, depending on the setting of the TIME key.
- [I] MEMO Indicates that a tape address has been stored (MEMO key).
- [K] Peak level indicators for the right-hand and left-hand channel.

1.4 Connectors and cabling

- [1] FADER START When the fader is opened, the cassette recorder switches to PLAY mode. When the fader is closed, it switches to PAUSE mode. If REC is pressed beforehand, actuation of the fader initiates a recording start or REC/PAUSE.
When the fader is active, the keyboard is disabled for further input. The recorder can be operated normally again as soon as the fader is deactivated.
- [2] INPUT High-level input sockets (XLR), channel L and R.
- [3] OUTPUT High-level output socket (XLR), channel L and R.
- [4] LEVEL dBu Output level switch for basic level.
- [5] 230 / 115 VAC Line voltage selector.
- [6] T 315 mA Primary fuse
- [7] AC POWER Power inlet.
- [8] ON /OFF Power switch.

1.5 Operation

1.5.1 Recording

1. Switch on the recorder and insert a tape cassette.
2. Activate the Dolby noise reduction system*, if desired. For recording a stereo FM program with Dolby noise reduction, activate the MPX filter.
3. Select the tape timer mode by pressing the TIME key and reset the timer by pressing the RESET key.
6. Select the bias and record signal level in accordance with the cassette type being used. (→ 1.5.6).
7. Adjust the record level as follows:
 - Press the REC key to switch the equipment to REC/PAUSE mode. REC lights up.
 - Start the recording source and adjust the INPUT LEVEL potentiometer in such a way that the peak level meter does not exceed the marking for optimum recording level.
8. Rewind to the start of the source and start the recording by pressing the PLAY or PAUSE key.
Select the desired monitor mode (SOURCE/PLAY) by selecting the MON key.
The recording can be interrupted with PAUSE and resumed with either PLAY or PAUSE.

Fast rewind

While the recording is in progress, press REW without first pressing the STOP key. This cancels the recording and rewinds the tape to the start of the recording. The recorder then switches to play mode.

1.5.2 Playback

1. Switch on the recorder and insert a tape cassette.
2. If the cassette was recorded with Dolby noise reduction, select the same Dolby system on the recorder.
3. Select the tape timer mode by pressing the TIME key and reset the timer by pressing the RESET key.
4. Press PLAY to start the playback.

1.5.3 Selection search

With this function you can search the start of a selection. The start of the desired selection may be up to 15 selections before or after the current selection.

Searching the 10th selection **following** the current selection:

1. Press the QMS key 10 times. The wording "P-10" appears on the display.
2. Press the FF key. The tape is spooled forward to the start of the desired selection. The recorder then switches to play.

Search the 10 selection **before** the current selection:

1. To search the 10th selection before the current selection, the QMS key must be pressed 11 times. The selection search is based on recognizing unrecorded gaps between the individual selections. For this reason one additional gap must be counted in the reverse search direction.
2. Press the REW key, the tape is spooled to the start of the desired selection. The recorder then switches to play.

1.5.4 MEMO Function

The MEMO key is pressed for storing any tape address that you subsequently want to search again.

1. In play mode press the MEMO key in the position that is to be searched again.
This function always stores the address at which the tape is located when the MEMO key is pressed.
2. To search the stored address, press the FF or REW key, depending on whether the stored position is located before or after the current tape address. The tape search stops automatically when the desired address is reached.

1.5.5 Dolby noise reduction system*

Dolby-B:

The Dolby-B noise reduction system increases the level of the weak signals in the mid and high frequency range during the recording process, and correspondingly deemphasizes these signals during playback. The playback corresponds exactly to the original sound, but the tape noise will be reduced.

Dolby-C:

The Dolby C noise reduction system is similar to Dolby B. However, the range in which Dolby C emphasizes the level during the recording and deemphasizes the level during playback is much larger, which results in superior noise reduction.

1.5.6 Calibration

The factory optimizes the cassette deck alignments to the cassette types specified in the "Technical data".

When the cassette is inserted, the tape type is automatically selected and shown on the display segment [G].

The BIAS and CALIBRATION potentiometers are used for adjustment to different batches of the same cassette brand, as well as to different brands of cassettes type I and II.

With CALIBRATION the source/tape level can be adjusted to identical values based on the level indication [K] on the display.

With BIAS you can align to identical treble reproduction.

Comparison is possible by changing over between SOURCE / TAPE in record mode. As a test signal the noise of an FM tuner (without signal and without muting), or any other high-frequency audio source can be used.

2. ASSEMBLY / DISASSEMBLY

2.1 General informations

Caution: Disconnect the tape recorder from the AC power source before you remove any housing parts or electronic modules!



Important: Handling of MOS components:



MOS components can be destroyed by electrostatic discharges. When working on equipment containing MOS components, the following precautions should be observed:

1. Electrostatically sensitive components must be stored and transported in the corresponding protective packaging.
2. Avoid any contact of the pins with plastic packing material, styrofoam or other chargeable materials.
3. Do not touch the pins with an ungrounded wrist.
4. Use a grounded, conductive pad as a work surface.
5. Do not unplug or insert circuit boards while the cassette recorder is under voltage.

2.1.1 Maintenance

All bearings are lubricated for life and require no maintenance.

2.1.2 Required tools

1 Screwdriver	Size 1
1 Phillips screwdriver	Size 1
1 Phillips screwdriver	Size 2
1 "ESE" workplace kit	Part No. 46200

Note: Line the bench with a piece of cotton cloth or similar to prevent marring of the housing surfaces.

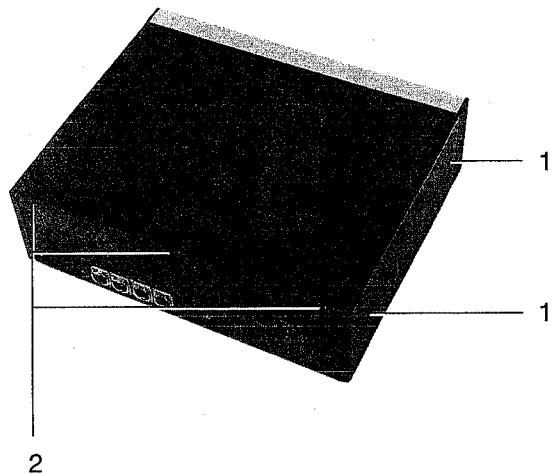
2.1.3 Reassembly

The unit is reassembled analogously by performing the disassembly steps in the reverse order and by following the explicit assembly instructions.

2.2 Disassembly

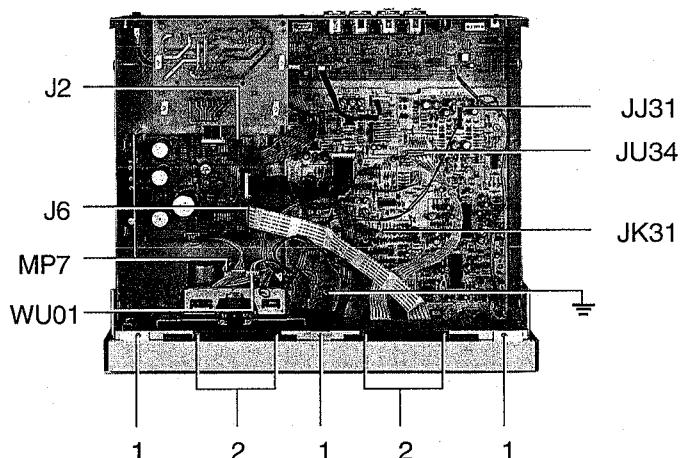
2.2.1 Housing

1. Unfasten two screws (1) on the side panel and three screws (2) on the back.
Lift the cover and pull it off toward the back.



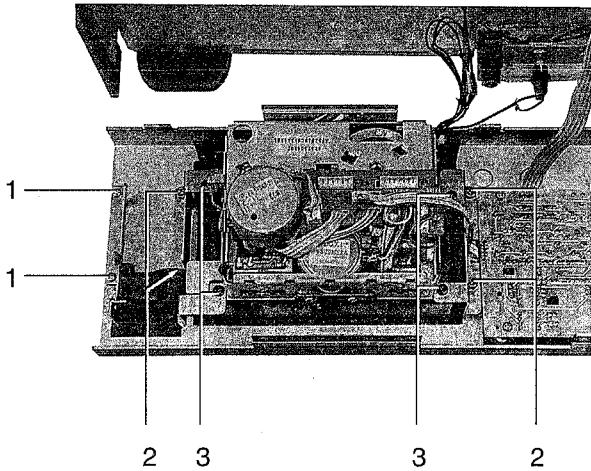
2.2.2 Front Unit

1. For removing the front unit, the following connectors must be detached:
 - J 6 on the power supply unit
 - J 2 on the power supply unit
 - MP 7 on the cassette deck
 - WU 01 on the cassette deck
 - JJ 31 on the audio board
 - JK 31 on the audio board
 - JU 34 on the audio board
 - Ground screw on the audio board
2. Unfasten three screws (1) on the front trim strip and remove the strip.
3. Unfasten four screws (2) on the front unit.
4. Pull the front unit evenly upward (approx. 1/2 cm / 1/4") until it disengages from the lower retainer.
5. Carefully move the front unit toward the front and set it on a piece of cotton cloth.



2.2.3 Cassette deck assembly

1. Detach the connector MP 5 to the front unit.
2. Press the cassette eject button and lift off the cassette deck trim strip.
3. Unfasten the two screws (1) from the lever mechanism and remove the latter.
4. Unfasten the four screws (2) of the two mounting flanges (do not lose the washers).
5. The cassette deck and the cassette compartment can now be removed as a complete unit.
6. To detach the cassette compartment from the deck, unfasten the four screws (3), remove the mounting flanges, and carefully lift out the cassette deck.
7. By reassembling, make shure that the cassette compartment fits symmetrically the front pannel opening.



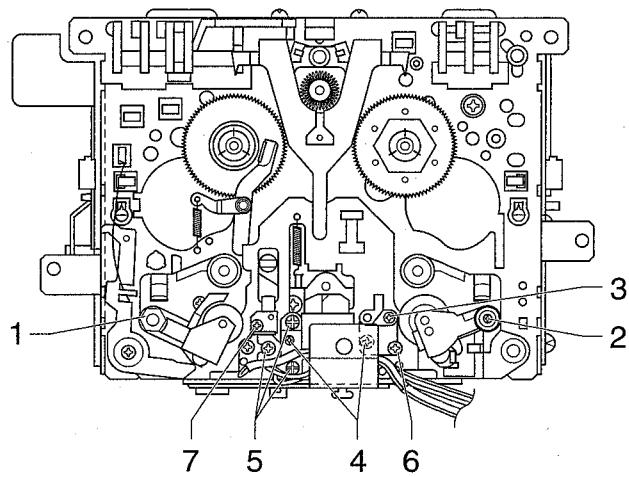
2.3 Cassette deck mechanism

2.3.1 Tape guide rollers

- 1 Fixing and adjusting nut of the left-hand tape guide roller
- 2 Fixing screw of the right-hand tape guide roller
- 3 Fixing and adjusting screw of the right-hand tape guide roller

2.3.2 Soundheads

- 4 Two fixing screws of the record/reproduce head and the swivel plate.
- 5 Three adjusting screws for REC/PB head height and parallel alignment
- 6 Azimuth adjustment screw
- 7 Fixing screw for the erase head



2.4 Electronic modules

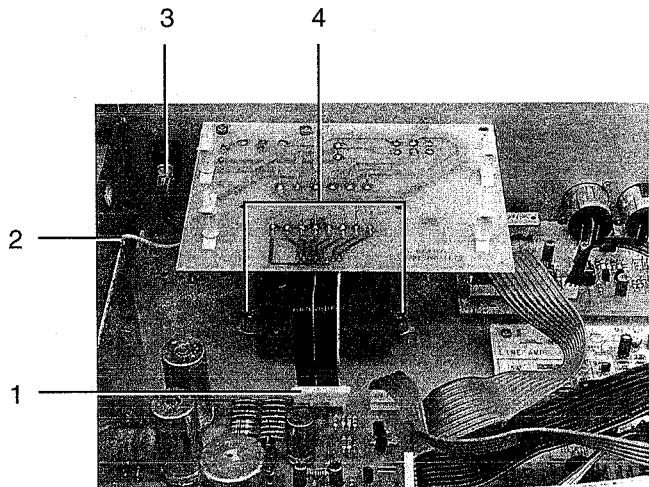
For replacing electronic modules, open the recorder as described in Section 2.2.1.

For removing the front unit, proceed according to Section 2.2.2.

2.4.1 Mains Unit

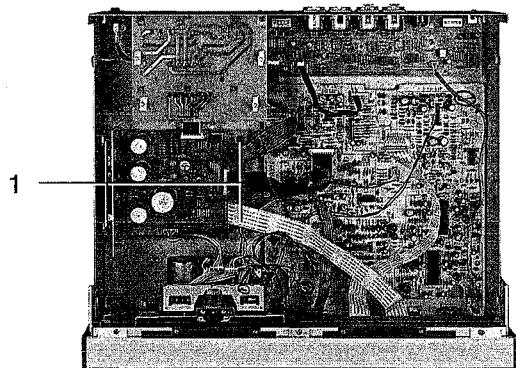
Caution: Pull out the AC power plug before you remove the mains unit.

1. Detach connector J 4 (1) on the power supply unit.
2. Remove the acrylic glass cover by pressing the clamping pins together.
3. Detach the ground connection (2) on the side panel and the two connectors (3) on the power switch.
4. Unfasten three screws on the back of the chassis, unfasten the two (4) of the power transformer and remove the mains unit.



1.4.2 Power supply Unit

1. Detach the following connectors:
 - J 1 of the mains unit
 - J 3 of the audio board
 - J 4 of the front unit
 - J 2 of the front unit
 - J 1/ J 2 of the IN/OUT unit
 - MP 7 on the cassette deck
2. Unfasten four screws (1) and remove the circuit board.

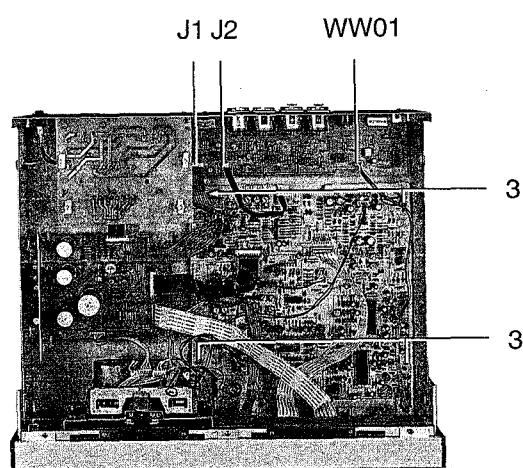
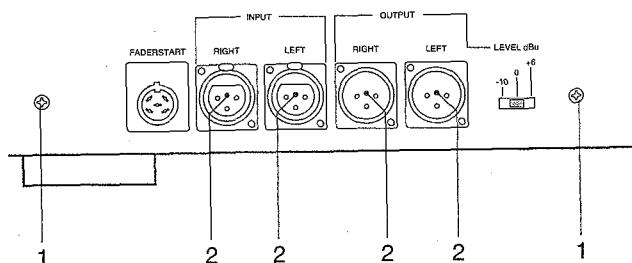


2.4.3 IN / OUT Unit

1. Unsolder the connections of J 1 and J 2 on the circuit board. Unsolder the cable WW 01 (note the polarity).
2. Unfasten the two screws (1) on the back of the chassis.
3. Insert a screwdriver size 00 through the center hole of the input / output sockets (2) on the back of the chassis and turn the catch counterclockwise by 45°.
4. Lightly lift the IN/Out board and pull it forward by a short distance. Then release the catches at the inserts of the input connectors and remove the board completely.

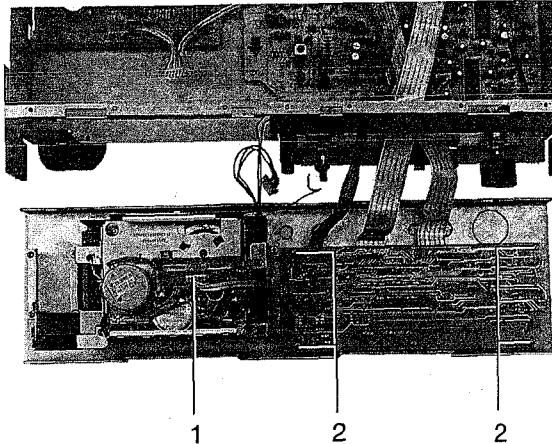
2.4.4 Audio board

1. Detach the following connectors:
 - J 2 of the IN/OUT unit
 - WW 01 of the IN/OUT unit (unsolder)
 - JU 34 of the front unit
 - JJ 31, WU 01, JK 31 and GROUND of the cassette deck
 - J 832 of the power supply unit
2. Unfasten four screws (3) and slide out the board toward the back.



2.4.5 Front Unit

1. Detach the MP 5 (1) cable on the cassette deck.
2. Unfasten seven screws (2) on the front unit (do not lose the washers), and carefully remove the board. Make sure that the red display trim strip does not get scratched.



3. FUNCTIONAL DESCRIPTION

3.1 Cassette deck

The cassette deck is equipped with a dual capstan drive. The controlled DC motor drives the righthand capstan shaft via a flat belt. From this shaft the left-hand capstan is driven by a second flat belt.

The capstan drive control is integrated in the motor housing. The capstan speed can be adjusted with a trimmer (-> 4.2.3).

The headblock assembly is actuated by the capstan motor via a cam disc. Coupling/decoupling is performed by a small solenoid.

The brakes are also controlled via a cam disc.

The spooling motor drives the spindles via a gear train. The left-hand or right-hand spindle is driven, depending on the selected spooling direction. Each spindle has its own light barrier that supplies the tape timer information to the microprocessor.

3.2 Control

POWER SUPPLY:

The power supply Unit contains the power supply and the spooling motor drive.

The power supply generates the following voltages:

- +/-12 V DC for audio, stabilized a with rectifier (D 4 - 11) and voltage regulator (IC 1 and 2)
- +14 V DC unstabilized from the rectifier (D 12 - 19), for the capstan motor, the spooling motor and the solenoid.
- +5 V DC from the +14 V, stabilized by IC 3, for the processor control.
- 4,3 V AC (FIL) for the heating coil of the display
- -30 V DC from D 20 for the display.

If the 5 V supply drops below a certain value when the cassette recorder is switched off or in the event of a power failure, a reset is generated by the regulator IC 3.

IC 4 contains the drivers for the spooling motor. Depending on the cassette deck status, a corresponding voltage is applied to the spooling motor.

FRONT UNIT:

The front unit contains the input keypad as well as the microprocessor. The latter is responsible for scanning the keyboard, for controlling the display, and for calculating the tape timer and peak meter information.

A special feature of this processor are the high-voltage outputs through which the FIP can be controlled directly. The internal A/D converter is used for peak level measurement and for keyboard scanning.

3.3 Audio electronics

AUDIO BOARD

The complete audio electronics is located on the audio board.

Recording section:

The input signal is taken via the volume control RV 01 to the Dolby B/C encoder Q 651. The multiplex filter is connected after the first linear state and switched on or off by means of the transistors Q 653 and Q 654. After a second stage within Q 651, the audio signal is taken to the monitor switch QT 51 (changeover between source and tape). The coded record signal is available on pins 21 and 22 of Q 651 and is taken via internal and external calibration potentiometers to the record amplifier QK 01. The latter is equipped with internal equalization selection switches. After the RF bias trap the RF is added to the AF signal via the transformers L 901 and L 902. The HX PRO circuit is implemented with IC Q 901 which contains the rectifier, the integral controller and the VCA. IC Q 921 is used for switching the HX PRO circuit on / off which in this recorder is continually on. This means that the HX PRO circuit always receives the signal after the two lowpass elements R 906 / C 902 and R 905 / 901. The erase oscillator is implemented as a push-pull stage and oscillates with a frequency of 105 kHz. It supplies the RF signal to the HX PRO circuit.

Reproduce section:

The reproduce signal is amplified in IC QJ 31 which features a low-noise FET input stage. The reproduce time constants are implemented in a push-pull stage and can be changed over between 70 and 120 µs (QJ 05 / 06). The output signal is taken to the level and treble control as well as to the Dolby B/C Decoder chip Q 601. The aggregate signal of the right-hand and left-hand channel is taken to the pause detection circuit implemented with QB 01. The output of the Dolby detector is taken to the monitor switch and to the peak meter amplifier QX 01, to the headphones volume control comprising the amplifier stage QG 01, and to the buffer amplifier IC 1 / IC 2 (on the IN/OUT unit).

The output level switch which controls Q 1...Q 4 has three positions:

- 10 dBu
- 0 dBu
- + 6 dBu

The audio signal is subsequently taken to the balancing amplifier IC 3, IC 4 and finally to the XLR sockets output left/right.

4. ALIGNMENT INSTRUCTIONS

4.1 General information

Caution: Shock hazard when the tape recorder is opened. Certain parts are energized with line voltage!

4.1.1 Tools

The following equipment and tools are required for the alignment work:

AF millivoltmeter	Part No. 46020
AF Generator	Part No. 46021
Demagnetizing choke:	
- Large	Part No. 46595
- Small	Part No. 46596
Reproduce reference tape	Part No. 46034
Frequency counter	Part No. 46025
2-beam oscilloscope	
Analog multimeter	
Selective voltmeter or Bandpass (fm =1kHz; BW ≤100 Hz)	
Tweezers	
Screwdriver	Size: 00
Screwdriver	Size: 0
Screwdriver	Size: 2
Screwdriver	Size: 3
Hexagon-socket-screw key	Size: 2.5
Tape path alignment gauge	Part No.: 46172
Head face alignment cassette	Part No.: 46040
Wow and flutter calibration cassette	Part. No.: 46037

4.1.2 Demagnetization

Before any alignment work and in intervals of every few weeks, the cassette recorder should be demagnetized. Switch the cassette recorder off, make sure that no cassette is in the compartment and that no cassettes are located in the vicinity of the recorder. Slowly approach but do not contact the part to be demagnetized with the tip of the choke and after a short moment slowly retract the choke; or with a regulating transformer slowly increase the choke voltage to maximum and back to minimum. This procedure is to be performed for all metal parts (sound heads, tape guides) that come in contact with the tape. Before you switch off the choke remove it at least 50 cm from the cassette recorder.

Caution: If the demagnetizing choke comes close to recorded cassettes, the audio signals on the cassettes will be destroyed.

4.1.3 Level definitions

0 dBu	Δ	0,775 V _{eff}
+ 6 dBu	Δ	1,55 V _{eff}
-10 dBu	Δ	0,254 V _{eff}
0 dBu	Δ	0 dB level

4.2 Cassette deck alignments

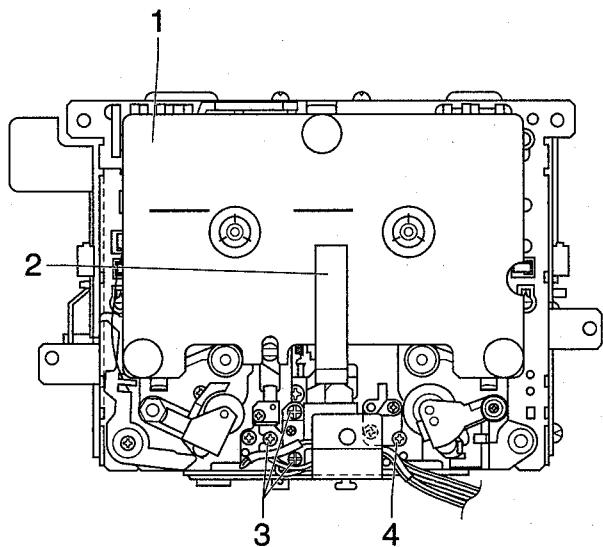
The tape deck is factory aligned. If the complete cassette deck is replaced, only an electronic azimuth check needs to be performed.

If realignment is necessary for any reason, the cassette tape deck must be removed. A soundhead alignment gauge (1) Part No. 46172 is required.

To remove the cassette tape deck proceed according to 2.2 / 2.3.

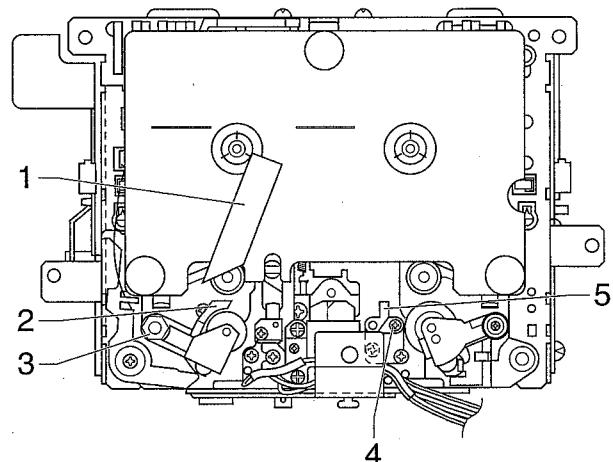
4.2.1 Record / reproduce head

1. Check the height and parallel alignment of the soundheads with the aid of the vernier calipers (2).
2. Adjust the height and the parallel alignment with the three adjustment screws (3).
3. Correct the azimuth with the adjustment screw (4).
4. Before reinstallation, carefully clean all cassette deck components and demagnetize the soundheads.
(-> 4.1.2).
5. For fine-adjustment install the cassette deck, remove the cassette deck trim strip, and play the reference cassette (Part No. 46034).
6. Align for minimum phase error with the azimuth adjustment screw (4), using the 10 kHz signal.



4.2.2 Tape guidance

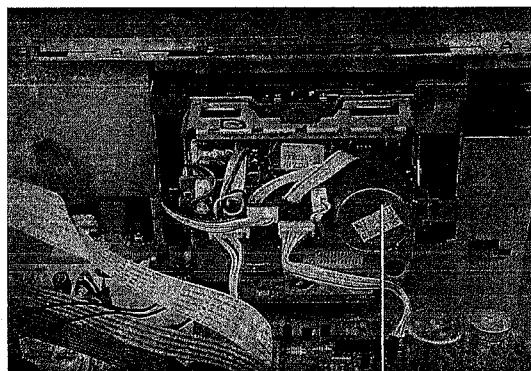
1. Check the height of the left-hand tape roller (2) with the aid of the vernier calipers (1).
2. If necessary, correct the setting with the adjustment nut (3).
3. Check the height of the right-hand guide (5) with the aid of the vernier calipers (1).
4. If necessary, correct the setting with the adjustment screw (4).



4.2.3 Adjusting the capstan speed

The capstan speed can be adjusted while the cassette deck is installed.

1. Insert and play the alignment cassette.
2. To adjust the speed, insert the screwdriver size 00 through the opening at the back of the motor housing (1) and turn the adjustment element. The speed should be adjusted within a tolerance of +/- 0.2%.

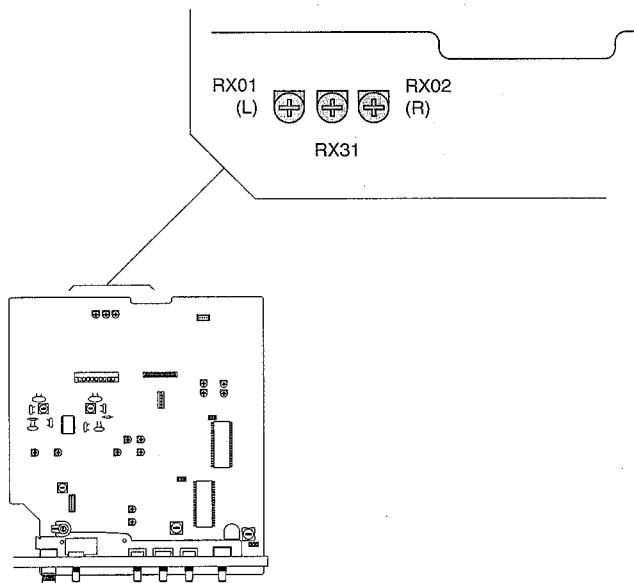


4.3 Audio alignments

All adjustment controls for this work are located on the audio board.

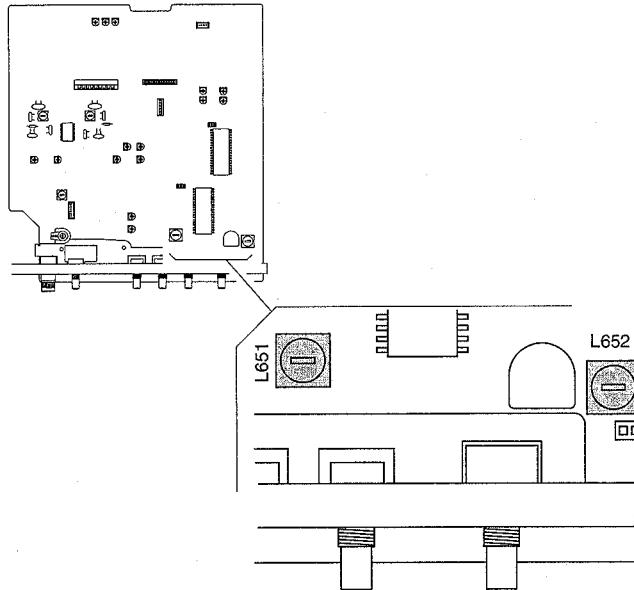
4.3.1 Peak meter

- Connect the AF generator to the AUDIO IN sockets.
- Connect the AF millivoltmeter to the AUDIO OUT sockets L, R.
- Set the OUTPUT LEVEL switch to the 0 dBu position.
- Press the REC key to switch to SOURCE (Rec/Pause).
- From the generator feed a 1 kHz sine-wave signal so that a level of 775mV appears on the output.
- With the trimmer RX 01 (left) and RX 02 (right) adjust to 0 dB.
- Lower the input level by 35 dB and adjust the trimmer RX 31 in such a way that only the first segment lights up on the peak meter.



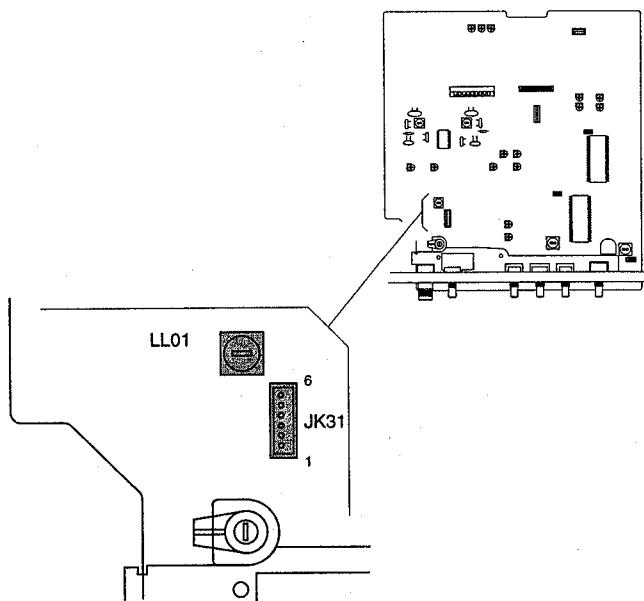
4.3.2 Frequency response with tape, MPX filter

- Frequency response check (level 0 dB display, freq. 30 Hz - 18 kHz +/-1 dB)
- Feed 19 kHz 0 level 0 dB display to the INPUT sockets.
- Switch the recorder to REC/Pause by pressing the REC key.
- Switch on the MPX filter.
- Adjust the coils L 651 and L 652 to minimum level. The level should be attenuated by at least 30 dB.



4.3.3 Aligning the erase frequency

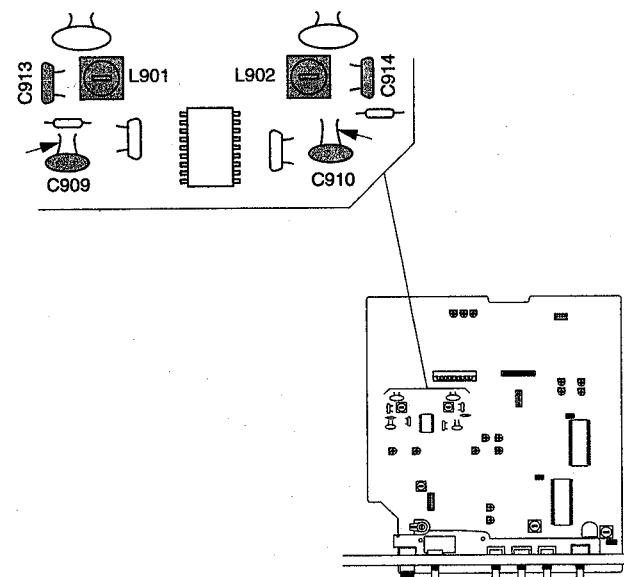
- Switch on the cassette recorder and activate the record mode.
- Connect the frequency counter to pin 6 of the edge connector JK 31.
- Adjust the frequency to 105 kHz by aligning the core of transformer LL 01.



4.3.4 Aligning the erase and record head

- Switch on the cassette recorder and activate play mode.
- Connect the oscilloscope with 10:1 probe to the intersection C 909 / 913.
- By tuning the core of transformer L901 align the resonant circuit of the left-hand channel to a clean sinusoidal shape.
- Connect the oscilloscope probe to the intersection C910 / 914.
- By tuning the core of the transformer L 902, align the sine-wave shape of the right-hand channel.

Note: For the RF measurements described in Sections 4.3.3 and 4.3.4, the test points should be loaded with max. 20 pF, otherwise the adjustment will not be optimal.



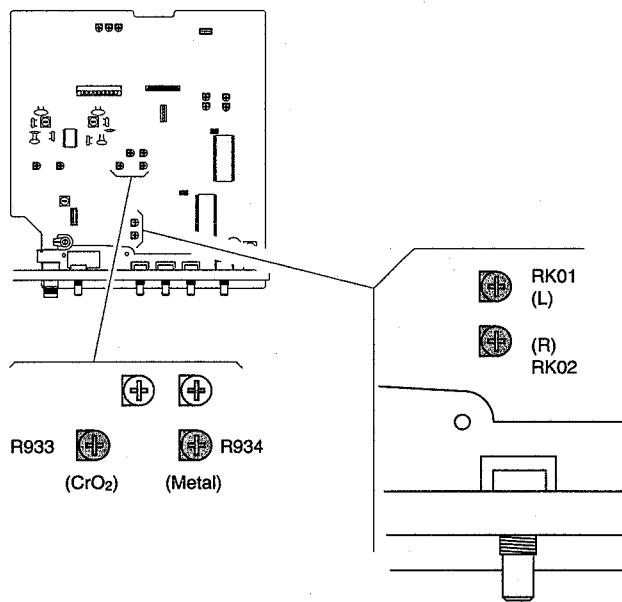
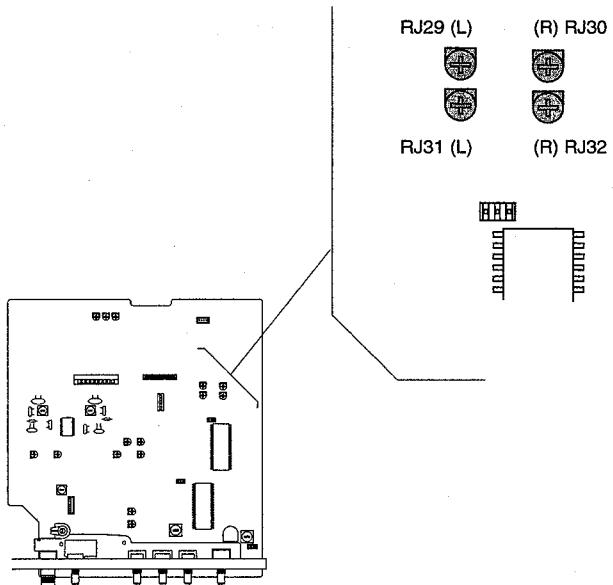
4.3.5 Playback

- Switch the cassette recorder off, thoroughly clean the tape guidance elements , and demagnetize the heads. (-> 4.1.2).
- Set the output level switch on the rear panel to "0 dBu".
- Insert the reproduce frequency response calibration cassette.
- Spool the reference tape forward to the 10 kHz section and start the recorder in play mode.
- Connect the LINE OUTPUT L and R to CH 1 and 2 of the oscilloscope and align the reproduce head to identical phase position of the channels.
- In the 315 Hz level tone section of the tape, align the reproduce level of the corresponding channel with the aid of the trimmers RJ 29 and RJ 30.
- The output level at "0 dBu" corresponds to 775 mV with a magnetic flux of 200 nWb/m, or 969 mV for a flux of 250 nWb/m.
- With the trimmer RJ 31 (left) and RJ 32 (right) align to a linear reproduce frequency response (0...+1 dB) at a frequency of 12.5 kHz.

4.3.6 BIAS and REC LEVEL alignment

- Turn the front-panel Bias-Cal and Level-Cal potentiometers to their center positions.
- Open the level trimmer potentiometers RK 01 and RK 02 to approx. 2/3 of the maximum.
- Insert the IEC I cassette.
- Start the machine in record mode.
- Switch between 500 Hz and 12 kHz -20 dBu at the inputs.
- With the bias potentiometer align to a linear frequency response. (The correct value is determined by opening the potentiometer at 12 kHz from the counterclockwise stop position past the level maximum until the same value is measured as for 500 Hz.
- Feed 500 Hz and adjust the level with the trimmers RK 01 and RK 02 in such a way that the levels for source and tape are identical.
- For chromium dioxide tape and metal tape, align the bias in such a way that a linear frequency response is achieved. Only one bias setting is possible for both channels. R 933 for chromium dioxide and R 934 for metal tape. If bias corrections are required in the level or between the channels, these should be very small because they also influence the IEC I settings.

Note: It is important to start the alignment with the IEC I tape in order not to influence the adjustments of the other tape types.



4.4 Measurement of various ratings

4.4.1 Distortion with tape

The distortion of cassette recorders is measured with a K3-filter (bandpass for 3rd harmonic). The AF generator frequency must be selected in accordance with the existing filter (e.g. 333 Hz for a filter frequency of 1000 Hz). The measurement relates to maximum output level.

- Connect the AF generator to the AUDIO IN socket.
- Set the frequency.
- Connect the distortion meter to AUDIO OUT.
- Insert a new tape. Start the cassette deck in record mode and measure the distortion. The maximum values can be found in the technical data (-> 5).

4.4.2 Signal-to-noise ratio with tape

- The signal to noise ratios (linear and weighted) relate to 3% distortion.
- The measured values are specified in the technical data (-> 5).

4.4.3 Erase depth

For measuring the erase depth, a signal is recorded and erased. The residual signal on the tape is measured selectively (narrow-band).

- Preselect an AF generator frequency of 1 kHz
- Connect a selective voltmeter (with 1 kHz bandpass) to OUTPUT.
- Record the signal with a level of 250 nWb/m
- Switch the generator off.
- Rewind the tape and start again in record mode.
- Measured value: better than -65 dB for type II.

4.4.4 Crosstalk

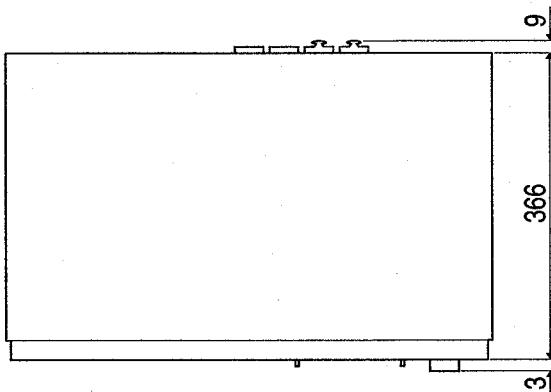
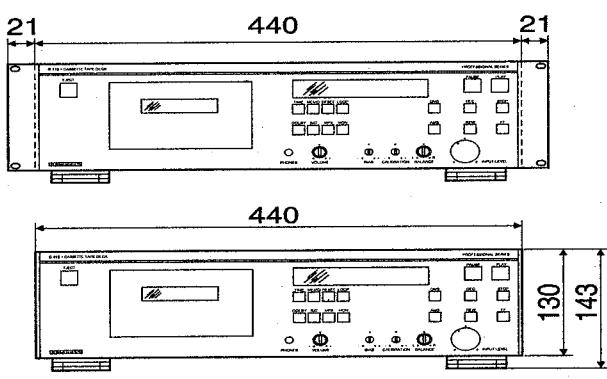
- Measuring signal: 1 kHz / 0 dB.
- The measured value on the channel without signal should be better than -40 dB.

4.4.5 Wow and flutter

- The wow-and-flutter values given in the specifications have been measured with a wow-and-flutter meter according to JIS in Playback mode.

5. TECHNICAL DATA

Tape cassettes:	Compact cassettes up to C-120	Bias / Erase frequency:	105 kHz
Tape deck:	Dual capstan tape transport with controlled spooling drive. Separate head system for record and playback, ferrite erase head	Erase efficiency:	> 65 dB @ 1 kHz (DOLBY C = ON)
Tape speed / tolerance:	1 7/8 ips ± 0.5 %	Input AUDIO IN	
Tape slip:	< 0.3 %	Sensitivity:	70 mV for 200 nWb/m
Wow and flutter:	< 0.1 % for C-60 and C-90 cassettes, in playback mode (weighted according to JIS)	Input impedance:	> 10 kohms
Spooling time:	95 s for C-60 cassette	Max. input level:	10 V
Tape timer:	switchable between: • min / sec (elapsed real time) • linear counter, 4 digits	Outputs:	Values rel. to 200 nWb/m -10 / 0 / +6 dBm, Ri = 50 ohms max. 500 mV, Ri = 100 ohms
Automatic tape type changeover:	For tape types I, II and IV	Special function:	Faderstart, to be activated via 6-pole socket DIN 45322
Recording system:	HX PRO * Headroom Extension	Power requirements:	Selectable for 2 ranges: 115 V, range = 90 to 130 V 230 V, range = 190 to 260 V 50...60 Hz
Calibration aid:	With BIAS and LEVEL potentiometers via bargraph display	Power consumption:	30 W
Noise reduction system:	DOLBY B and C*, Double-Dolby system for source / tape monitoring	Power fuse, primary:	for 115 V: T315 mA slow-blow for 230 V: T315 mA slow-blow
Reproduce equalization:	Type I: 3180 + 120 µs Type II: 3180 + 70 µs Type IV: 3180 + 70 µs	Environmental operating conditions:	Ambient temperature +10 to +40°C Rel. humidity category F according to DIN 40040
Frequency response:	(with tape, -20 dB, Dolby NR = OFF) Type I: 30Hz...18 kHz ± 3dB Type II: 30Hz...17 kHz ± 3dB Type IV: 30Hz...17 kHz ± 3dB	Operating position:	Horizontal installation
Level Calibration:	200 nWb/m, corresponds to 0 dB = DOLBY level	Weight:	7.5 kg net
Harmonic distortion:	at 200 nWb/m (k3 of 333 Hz) Type I: <1.0 % Type II: <1.5 % Type IV: <1.5 %	External dimensions:	(WxHxD) w/o rack-mounting brackets 470 x 143 x 366 mm (height = 3 rack units)
Signal-to-noise ratio ref. to weighted 3% distortion:	Dolby C Type I: > 72 dB (A) Type II: > 73 dB (A) Type IV: > 73 dB (A)	Subject to change	The tape-specific specifications are achieved with modern high-quality cassettes. Values measured with:
Channel separation:	better than -40 dB @ 1 kHz		<ul style="list-style-type: none"> • Type I (Ferro): TDK AR-X • Type II (chromium): BASF Chrome Super II • Type IV (metal): TDK MA <p>* Dolby noise reduction and HX PRO headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX PRO was created by Bang & Olufsen. DOLBY, the double D symbol, and HX PRO are registered trademarks of Dolby Laboratories Licensing Corporation.</p>



20.21.7102 < SHEET METAL SCREW D.2.2 X4.5 BLECHSCHRAUBE D.2.2 X4.5 VIS A TOLE D.2.2 X4.5	50.09.0106 < IC NE-5532A = RC-5532ANB CI NE-5532A = RC-5532ANB
20.23.7355 < SELF TAPPING SCREW D.3 X8 KERBSCHRAUBE D.3 X8 VIS AUTO-TARAUDEUSE D.3 X8	50.10.0104 < IC LM-317 CI LM-317
20.25.0103 < SELF TAPPING SCREW D.2.2 X6.5 KERBSCHRAUBE D.2.2 X6.5 VIS AUTO-TARAUDEUSE D.2.2 X6.5	50.10.0105 < IC LM-337 CI LM-337
21.26.0354 < PHILLIPS HEAD SCREW M3 X6 ZYLINDERSCHRAUBE KS M3 X6 VIS CYLINDRIQUE CRUCIF.M3 X6	50.17.1132 < IC MC-74HC132AN CI MC-74HC132AN
21.26.0455 < PHILLIPS HEAD SCREW M4 X8 ZYLINDERSCHRAUBE KS M4 X8 VIS CYLINDRIQUE CRUCIF.M4 X8	50.43.0350 E 50.03.0350 50.43.0351 E 50.03.0351 50.43.0436 E 50.03.0524 50.43.0515 E 50.03.0496
21.46.0354 < TORX HEAD SCREW M3 X6 ZYLINDERSCHRAUBE TORX M3 X6 VIS CYLINDRIQUE TORX M3 X6	50.99.0126 < OPTO-COUPLER 4N-28 = 4N-26 OPTO-KOPPLER 4N-28 = 4N-26 OPTO-COUPLEUR 4N-28 = 4N-26
21.46.0454 < TORX HEAD SCREW M4 X6 ZYLINDERSCHRAUBE TORX M4 X6 VIS CYLINDRIQUE TORX M4 X6	51.01.0112 < FUSE 0.3A SICHERUNG 0.3A FUSIBLE 0.3A
21.47.0354 < TORX HEAD SCREW M3 X6 BLK ZYL.SCHRAUBE TORX M3 X6 BLK VIS CYLIND. TORX M3 X6 BLK	51.01.0114 < FUSE 0.5A SICHERUNG 0.5A FUSIBLE 0.5A
24.16.2030 < STAR WASHER FAECHERSCHEIBE RONDELLE GROWER	53.03.0142 < FUSE HOLDER 1/2 PCB MOUNT. SICHERUNGSHALTER PRINTBEF. 1/2 PORTE FUSIBLE CIR. IMPR. 1/2
50.03.0350 < TRANSISTOR J112 = MPF4392	53.03.0364 < IC SOCKET 64-P. IC SOCKEL 64-P. SOCLE CI 64-P.
50.03.0351 < TRANSISTOR 2N4403 = BC327-25	54.20.2001 < SOCKET DIN 6-P. PCB MOUNT. EINBAUBUCHSE 6-P. PRINTBEF. PRISE DIN 6-P. CIRCUIT IMPRIME
50.03.0496 < TRANSISTOR BC560 SEL. 100MA	54.21.1014 < PLUG DIN MAS-60 STECKER DIN MAS-60 FICHE DIN MAS-60
50.03.0504 < TRANSISTOR BD679=BDW63	54.21.2200 < CHASSIS PLUG XLR HOR. EINBAUSTECKER XLR WGR. FICHE CHASSIS XLR HOR.
50.03.0524 < TRANSISTOR BC550 E6310 100MA	54.21.2201 < CHASSIS SOCKET XLR HOR. EINBAUBUCHSE XLR WGR. PRISE CHASSIS XLR HOR.
50.04.0105 DIODE 1N-4004 E 50.04.0502	54.42.0020 < MAINS CONN. IEC-320 3-P.HOR. NETZANSCHLUSS IEC.320 3-P.WGR. PRISE SECTEUR IEC-320 3-P.HOR.
50.04.0125 < DIODE OF-159 = 1N-4448	54.99.0143 E 54.21.1014
50.04.0133 < DIODE BAW-20	55.03.0287 < SWITCH POWER. NETZSCHALTER INTERRUPTEUR SECTEUR
50.04.0502 < DIODE 1N-4005	55.12.0003 < SLIDE SWITCH SCHIEBESCHALTER COMMUTATEUR A GLISIERE
50.04.1103 < ZENER DIODE 7.5V DIODE ZENER 7.5V	55.17.1000 < SLIDE SWITCH 2X U SCHIEBESCHALTER 2X U INTERRUPTEUR A GLISIERE 2X U
50.04.1112 < ZENER DIODE 5.1V DIODE ZENER 5.1V	
50.04.1123 < ZENER DIODE 4.7V DIODE ZENER 4.7V	
50.04.1145 < ZENER DIODE 9.1V DIODE ZENER 9.1V	
50.04.2701 < LED MV-57123 = SPR-5551REC RED	
50.04.2702 < LED MV-53123 = SPY-5551REC YEL	
50.04.2703 < LED MV-54123 GRN	
50.09.0105 E 50.09.0106	

55.99.0158 < PULSE SWITCH IMPULSSCHALTER INTER. IMPULSION		59.41.5470 E 59.22.6470
57.19.0100 < FUSE RESISTOR 10E SICHERUNGSWIDERSTAND 10E RESISTANCE FUSIBLE 10E		59.41.6100 E 59.22.8100
57.19.0109 < FUSE RESISTOR 1E SICHERUNGSWIDERSTAND 1E RESISTANCE FUSIBLE 1E		59.41.6220 E 59.22.6220
57.19.0109 < FUSE RESISTOR 1E SICHERUNGSWIDERSTAND 1E RESISTANCE FUSIBLE 1E		59.41.8229 E 59.22.8229
57.19.0151 < FUSE RESISTOR 150E SICHERUNGSWIDERSTAND 150E RESISTANCE FUSIBLE 150E		59.41.8479 E 59.22.8479
57.19.0560 < FUSE RESISTOR 56E SICHERUNGSWIDERSTAND 56E RESISTANCE FUSIBLE 56E		62.02.3479 < RF CHOKE 4.7UH DROSSEL 4.7UH BOBINE DE CHOC 4.7UH
59.22.4221 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	220UF 16V 220UF 16V 220UF 16V	62.42.3479 E 62.02.3479
59.22.4471 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	470UF 16V 470UF 16V 470UF 16V	1.010.011.55 < PUSHBUTTON 17 DRUCKTASTE 17 TOUCHE 17
59.22.4472 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	4700UF 16V 4700UF 16V 4700UF 16V	1.010.012.55 < PUSHBUTTON 10 BLK DRUCKTASTE 10 BLK TOUCHE 10 BLK
59.22.5101 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	100UF 25V 100UF 25V 100UF 25V	1.010.021.23 < WASHER PAPER 4.3 X7.5 X1 UNTERLAGS Scheibe HP 4.3 X7.5 X1 RONDELLE PAPIER 4.3 X7.5 X1
59.22.5222 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	2200UF 25V 2200UF 25V 2200UF 25V	1.010.059.21 < OVAL HEAD SCREW TORX M4 X14 LINSENZYL.SCHR.TORX BLK M4 X14 VIS BOMBEE TORX BLK M4 X14
59.22.6220 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	22UF 40V 22UF 40V 22UF 40V	1.721.490.01 < AUDIO PCB PRINT AUDIO CARTE AUDIO
59.22.6470 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	47UF 40V 47UF 40V 47UF 40V	1.721.490.02 < TAPE TRANSPORT LAUFWERK MECANISME
59.22.8100 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	10UF 63V 10UF 63V 10UF 63V	1.721.490.03 < MAINS TRANSFORMER NETZTRANSFORMATOR TRANSFO.ALIMENTATION
59.22.8221 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	220UF 63V 220UF 63V 220UF 63V	1.721.490.18 < IC MOTOR CONTROL IC MOTORREGELUNG CI REGULATEUR MOTEUR
59.22.8229 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	2.2UF 50V 2.2UF 50V 2.2UF 50V	1.721.490.19 < IC +5V REGULATOR IC +5V REGELUNG CI REGULATEUR +5V
59.22.8479 < CAPACITOR EL. KONDENSATOR EL. CONDENSATEUR EL.	4.7UF 63V 4.7UF 63V 4.7UF 63V	1.721.490.21 < DISPLAY ANZEIGE AFFICHAGE
59.40.0103 < CAPACITOR KONDENSATOR CONDENSATEUR	10NF 10NF 10NF	1.721.490.24 < MICROPROCESSOR MIKROPROZESSOR MICROPROCESSEUR
59.41.2221 E 59.22.4221		1.721.490.27 < KNOB DREHKNOFF BOUTON
59.41.3101 E 59.22.5101		1.721.520.08 < ROCKER / EJECT BUTTON WIPPE / AUSLOESETASTE BASCULE RENVOI/TOUCHE EJECT
59.41.4221 E 59.22.4221		1.721.600.00 < AUDIO PCB PRINT AUDIO CARTE AUDIO

- 1.721.600.01 < POTMETER 100K
POTENTIOMETRE 100K
- 1.721.720.01 < FRONT PANEL
FRONTPLATTE
PLAQUE FRONTALE
- 1.721.720.02 < FRONT PROFILE TOP SECTION
FRONTPROFIL OBEN
PROFIL FRONTALE SUPERIEUR
- 1.721.720.03 < GLASS PANEL
GLASSCHEIBE
FENETRE
- 1.721.720.04 < GUIDE / PUSHBUTTON
TASTENFUEHRUNG
GUIDE DE TOUCHE
- 1.721.720.05 < PUSHBUTTON EJECT
AUSLOESETASTE
TOUCHE EJECT
- 1.721.720.07 < EXTENSION / PUSHBUTTON
TASTENVERLAENGERUNG
RALLONGE DE TOUCHE
- 1.721.720.14 < WEDGE RIGHT
ABSCHLUSSTEIL RECHTS
MONTANT DROIT
- 1.721.720.15 < WEDGE LEFT
ABSCHLUSSTEIL LINKS
MONTANT GAUCHE
- 1.721.720.19 < BUTTON
STECKWELLE
- 1.721.720.20 < KNOB
DREHKNOPF
BOUTON
- 1.721.720.25 < FRONT ..
TUERBLEINDE
- 1.721.790.05 < PUSHBUTTON SWITCH 2X A
DRUCKTASTENSCHALTER 2X A
INTERRUPEUR POUSSOIRE 2X A
- 1.747.500.05 < FOOT
FUSS
PIED
- C115 / 25.05.92
C115
BR.

1.721.750.00 MAINS UNIT C115

Ad ..Pos... ...Ref.No... Description

C.....2	59.14.3222	2.2 nF	20%, 440VAC, Y
C.....3	59.14.3222	2.2 nF	20%, 440VAC, Y
F.....1	51.01.0112	T315mA	Fuse
MP....1	1.721.750.11		Mains Unit PCB
MP....2	53.03.0145		Fuseholder
MP....3	1.726.780.01		Holder
MP....4	28.21.2405		Tubular Rivet
MP....5	1.721.750.01	2 pcs	Holder
MP....6	28.21.2408	2 pcs	Tubular Rivet
P....1	54.42.0020		Mains Connector
S....2	55.17.1000		Mains Switch
W....1	1.721.490.10		Jumper Lead 8-pole
W....2	1.721.750.93		Wire List

00 PS 91/10/03

END

1.721.760.00 POWER SUPPLY C 115 ESE

Ad ..Pos... ...Ref.No... Description

C.....1	59.22.6100	10 uF	-20%, 35V, EL
C.....2	59.22.6100	10 uF	-20%, 35V, EL
C.....3	59.22.6100	10 uF	-20%, 35V, EL
C.....4	59.22.6100	10 uF	-20%, 35V, EL
C.....5	59.06.0224	220 nF	10%, 63V, PETP
C.....6	59.06.0104	100 nF	10%, 63V, PETP
C.....7	59.06.0104	100 nF	10%, 63V, PETP
C.....8	59.22.4471	470 uF	-20%, 16V, EL
C.....9	59.22.5222	2.2 mF	-20%, 25V, EL
C.....10	59.22.5222	2.2 mF	-20%, 25V, EL
C.....11	59.22.4472	4.7 mF	-20%, 16V, EL
C.....12	59.22.5472	4.7 mF	-20%, 25V, EL
C.....13	59.06.0104	100 nF	10%, 63V, PETP
C.....14	59.06.0104	100 nF	10%, 63V, PETP
C.....15	59.22.8221	220 uF	-20%, 63V, EL
C.....16	59.22.8229	2.2 uF	-20%, 63V, EL
C.....17	59.22.8479	4.7 uF	-20%, 63V, EL
C.....18	59.06.0223	22 nF	10%, 63V, PETP
C.....19	59.06.0103	10 nF	10%, 63V, PETP
D....1	50.04.0105	IN 4004	SI any
D....2	50.04.0105	IN 4004	SI any
D....3	50.04.0105	IN 4004	SI any
D....4	50.04.0105	IN 4004	SI any
D....5	50.04.0105	IN 4004	SI any
D....6	50.04.0105	IN 4004	SI any
D....7	50.04.0105	IN 4004	SI any
D....8	50.04.0105	IN 4004	SI any
D....9	50.04.0105	IN 4004	SI any
D....10	50.04.0105	IN 4004	SI any
D....11	50.04.0105	IN 4004	SI any
D....12	50.04.0105	IN 4004	SI any
D....13	50.04.0105	IN 4004	SI any
D....14	50.04.0105	IN 4004	SI any
D....15	50.04.0105	IN 4004	SI any
D....16	50.04.0105	IN 4004	SI any
D....17	50.04.0105	IN 4004	SI any
D....18	50.04.0105	IN 4004	SI any
D....19	50.04.0105	IN 4004	SI any
D....20	50.04.0133	BAV 20	SI any
D....21	50.04.0133	BAV 20	SI any
D....22	50.04.0125	IN 4448	SI any
D....23	50.04.0125	IN 4448	SI any
D....24	50.04.0125	IN 4448	SI any
D....25	50.04.0105	IN 4004	SI any
D....26	50.04.0105	IN 4004	SI any
D....27	50.04.0125	IN 4448	SI any
DV....1	50.04.1103	7.5 V	5%, 0.50W
DV....2	50.04.1112	5.1 V	5%, 0.50W
DV....3	50.04.1103	7.5 V	5%, 0.50W
DV....4	50.04.1123	4.7 V	5%, 0.50W
F....1	51.01.0114	T500mA	Fuse
IC....1	50.10.0104	LH 317T	+1.2-37 V , 1.5A , V-Reg.
IC....2	50.10.0105	LH 337T	-1.2-37 V , 1.5A , V-Reg.
IC....3	1.721.490.19	L78MR05	Voltage Regulator
IC....4	1.721.490.18	BA6219	Motor Controller
J....1	1.721.490.07		Jack Jumper Socket 8-pole
J....2	54.12.0405		Socket 5-pol
J....3	1.721.490.08		Jack Jumper Socket 9-pole
J....4	1.721.490.09		Jack Flat Cable 17-pole
MP....1	1.721.760.11		Power Supply PCB
MP....2	1.746.220.04		Heatsink
MP....3	1.746.220.06		Thermoplastic-foil

MP....4	21.99.0180	2 pcs	Screw M3*5 rustless
MP....5	50.20.2003	3 pcs	Clamp for TO 220 Case
MP....6	53.03.0142	2 pcs	Fuseholder
MP....7	1.721.490.12		Connective Cord 6-pole
Q....1	50.03.0515	BC 307B	Small Signal PNP
Q....2	50.03.0515	BC 307B	Small Signal PNP
Q....3	50.03.0436	BC 237B	Small Signal NPN
Q....4	50.03.0436	BC 237B	Small Signal NPN
Q....5	50.03.0436	BC 237B	Small Signal NPN
Q....6	50.03.0436	BC 237B	Small Signal NPN
Q....7	50.03.0504	BD 679	Darlington NPN
Q....8	50.03.0504	BD 679	Darlington NPN
Q....9	50.03.0436	BC 237B	Small Signal NPN
Q....10	50.03.0436	BC 237B	Small Signal NPN
Q....11	50.03.0436	BC 237B	Small Signal NPN
Q....12	50.03.0515	BC 307B	Small Signal NPN
R....1	57.11.3221	220 Ohm	1%, 0.25W, MF
R....2	57.11.3182	1.8 kOhm	1%, 0.25W, MF
R....3	57.11.3182	1.8 kOhm	1%, 0.25W, MF
R....4	57.11.3221	220 Ohm	1%, 0.25W, MF
R....5	57.19.0100	10 Ohm	0.33W, Fusible Resistor
R....6	57.19.0109	1 Ohm	0.33W, Fusible Resistor
R....7	57.19.0109	1 Ohm	0.33W, Fusible Resistor
R....8	57.19.0109	1 Ohm	0.33W, Fusible Resistor
R....9	57.19.0109	1 Ohm	0.33W, Fusible Resistor
R....10	57.19.0560	56 Ohm	0.33W, Fusible Resistor
R....11	57.19.0109	1 Ohm	0.33W, Fusible Resistor
R....12	57.19.0109	1 Ohm	0.33W, Fusible Resistor
R....13	57.19.0151	150 Ohm	0.33W, Fusible Resistor
R....14	57.19.0151	150 Ohm	0.33W, Fusible Resistor
R....15	57.11.3103	10 kOhm	1%, 0.25W, MF
R....16	57.11.3104	100 kOhm	1%, 0.25W, MF
R....17	57.11.3104	100 kOhm	1%, 0.25W, MF
R....18	57.11.3104	100 kOhm	1%, 0.25W, MF
R....19	57.11.3102	1 kOhm	1%, 0.25W, MF
R....20	57.11.3682	6.8 kOhm	1%, 0.25W, MF
R....21	57.11.3103	10 kOhm	1%, 0.25W, MF
R....22	57.11.3223	22 kOhm	1%, 0.25W, MF
R....23	57.11.3223	22 kOhm	1%, 0.25W, MF
R....24	57.11.3223	22 kOhm	1%, 0.25W, MF
R....25	57.11.3103	10 kOhm	1%, 0.25W, MF
R....26	57.11.3222	2.2 kOhm	1%, 0.25W, MF
R....27	57.11.3223	22 kOhm	1%, 0.25W, MF
R....28	57.11.3473	47 kOhm	1%, 0.25W, MF
R....29	57.11.3472	4.7 kOhm	1%, 0.25W, MF
R....30	57.11.3103	10 kOhm	1%, 0.25W, MF
R....31	57.11.3393	39 kOhm	1%, 0.25W, MF
R....32	57.11.3473	47 kOhm	1%, 0.25W, MF
R....33	57.11.3473	47 kOhm	1%, 0.25W, MF
R....34	57.11.3473	47 kOhm	1%, 0.25W, MF
R....35	57.11.3103	10 kOhm	1%, 0.25W, MF
R....36	57.11.3103	10 kOhm	1%, 0.25W, MF
R....37	57.11.3223	22 kOhm	1%, 0.25W, MF
R....38	57.11.3103	10 kOhm	1%, 0.25W, MF
W....4	1.721.760.94		Flat Cable

00 PS 91/10/04

EL=Electrolytic, CER=Ceramic, PETP=Polyester, SI=Silicon, MF=Metalfilm

Manufacturer: NS=National Semiconductors, TI=Texas Instruments

MOT=Motorola, PH=Philips, ST=Studer, SGT=SGS Thomson

END

1.721.761.00 IN-OUT UNIT C115 ESE

Ad ...Pos... ...Ref.No... Description

C.....1	59.22.6220	22 uF	-20%	35V	EL	R.....5	57.11.3153	15 kOhm	1%, 0.25W , MF
C.....2	59.22.6220	22 uF	-20%	35V	EL	R.....6	57.11.3564	560 kOhm	1%, 0.25W , MF
C.....3	59.06.0104	100 nF	10%	63V	PETP	R.....7	57.11.3104	100 kOhm	1%, 0.25W , MF
C.....4	59.06.0104	100 nF	10%	63V	PETP	R.....8	57.11.3105	1 MOhm	1%, 0.25W , MF
C.....5	59.22.3101	100 uF	-20%	10V	EL	R.....9	57.11.3362	3.6 kOhm	1%, 0.25W , MF
C.....6	59.22.3101	100 uF	-20%	10V	EL	R.....10	57.11.3152	1.5 kOhm	1%, 0.25W , MF
C.....7	59.22.3101	100 uF	-20%	10V	EL	R.....11	57.11.3152	1.5 kOhm	1%, 0.25W , MF
C.....8	59.22.3101	100 uF	-20%	10V	EL	R.....12	57.11.3362	3.6 kOhm	1%, 0.25W , MF
C.....9	59.06.0104	100 nF	10%	63V	PETP	R.....13	57.11.3105	1 MOhm	1%, 0.25W , MF
C.....10	59.06.0104	100 nF	10%	63V	PETP	R.....14	57.11.3564	560 kOhm	1%, 0.25W , MF
C.....11	59.34.4151	150 pF	10%	63V	CER	R.....15	57.11.3153	15 kOhm	1%, 0.25W , MF
C.....12	59.34.4271	270 pF	10%	63V	CER	R.....16	57.11.3105	1 MOhm	1%, 0.25W , MF
C.....13	59.32.4681	680 pF	20%	50V	CER	R.....17	57.11.3272	2.7 kOhm	1%, 0.25W , MF
C.....14	59.32.4681	680 pF	20%	50V	CER	R.....18	57.11.3686	6.8 kOhm	1%, 0.25W , MF
C.....15	59.06.0104	100 nF	10%	63V	PETP	R.....19	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....16	59.06.0104	100 nF	10%	63V	PETP	R.....20	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....17	59.32.4681	680 pF	20%	50V	CER	R.....21	57.11.3153	15 Ohm	1%, 0.25W , MF
C.....18	59.32.4681	680 pF	20%	50V	CER	R.....22	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....19	59.34.4151	150 pF	10%	63V	CER	R.....23	57.11.3150	15 Ohm	1%, 0.25W , MF
C.....20	59.34.4271	270 pF	10%	63V	CER	R.....24	57.11.3689	6.8 Ohm	1%, 0.25W , MF
C.....21	59.05.1681	680 pF	1%	63V	PP	R.....25	57.11.3689	6.8 Ohm	1%, 0.25W , MF
C.....22	59.05.1681	680 pF	1%	63V	PP	R.....26	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....23	59.34.4560	56 pF	10%	63V	CER	R.....27	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....24	59.34.4560	56 pF	10%	63V	CER	R.....28	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....25	59.05.1681	680 pF	1%	63V	PP	R.....29	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....26	59.05.1681	680 pF	1%	63V	PP	R.....30	57.11.3152	1.5 kOhm	1%, 0.25W , MF
C.....27	59.22.8479	4.7 uF	-20%	25V	EL	R.....31	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....28	59.06.0105	1 uF	10%	63V	PETP	R.....32	57.11.3152	1.5 kOhm	1%, 0.25W , MF
C.....29	59.06.0223	22 nF	10%	63V	PETP	R.....33	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....30	59.22.5470	47 uF	-20%	25V	EL	R.....34	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....31	59.22.2221	220 uF	-20%	6V	EL	R.....35	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....32	59.22.2221	220 uF	-20%	6V	EL	R.....36	57.11.3152	15 Ohm	1%, 0.25W , MF
C.....33	59.22.2221	220 uF	-20%	6V	EL	R.....37	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....34	59.22.2221	220 uF	-20%	6V	EL	R.....38	57.11.3150	15 Ohm	1%, 0.25W , MF
C.....35	59.06.0104	100 nF	10%	63V	PETP	R.....39	57.11.3686	6.8 Ohm	1%, 0.25W , MF
C.....36	59.06.0104	100 nF	10%	63V	PETP	R.....40	57.11.3689	6.8 Ohm	1%, 0.25W , MF
C.....37	59.06.0104	100 nF	10%	63V	PETP	R.....41	57.11.3302	3 kOhm	1%, 0.25W , MF
C.....38	59.06.0104	100 nF	10%	63V	PETP	R.....42	57.11.3302	3 kOhm	1%, 0.25W , MF
D.....1	50.04.0125	IN 4448	SI	any		R.....43	57.11.3302	3 kOhm	1%, 0.25W , MF
D.....2	50.04.0125	IN 4448	SI	any		R.....44	57.11.3302	3 kOhm	1%, 0.25W , MF
D.....3	50.04.0125	IN 4448	SI	any		R.....45	57.11.3152	1.5 kOhm	1%, 0.25W , MF
D.....4	50.04.0125	IN 4448	SI	any		R.....46	57.11.3302	3 kOhm	1%, 0.25W , MF
D.....5	50.04.0125	IN 4448	SI	any		R.....47	57.11.3152	1.5 kOhm	1%, 0.25W , MF
D.....6	50.04.0125	IN 4448	SI	any		R.....48	57.11.3302	3 kOhm	1%, 0.25W , MF
IC.....1	50.09.0105	NE 5532	Operational-Amplifier	Sig		R.....49	57.11.3152	1.5 kOhm	1%, 0.25W , MF
IC.....2	50.09.0105	NE 5532	Operational-Amplifier	Sig		R.....50	57.11.3152	1.5 kOhm	1%, 0.25W , MF
IC.....3	50.09.0105	NE 5532	Operational-Amplifier	Sig		R.....51	57.11.3392	3.9 kOhm	1%, 0.25W , MF
IC.....4	50.09.0105	NE 5532	Operational-Amplifier	Sig		R.....52	57.11.3272	2.7 kOhm	1%, 0.25W , MF
IC.....5	50.09.0105	NE 5532	Operational-Amplifier	Sig		R.....53	57.11.3392	3.9 kOhm	1%, 0.25W , MF
IC.....6	50.99.0126	4N 28	Optical Coupler	NOT		R.....54	57.11.3272	2.7 kOhm	1%, 0.25W , MF
IC.....7	50.17.1132	74 HC 132	2-Input Schmitt Trigger NAND Gate			R.....55	57.11.3272	2.7 kOhm	1%, 0.25W , MF
J.....1	54.12.0405	Socket 5-pole				R.....56	57.11.3392	3.9 kOhm	1%, 0.25W , MF
J.....2	54.12.0405	Socket 5-pole				R.....57	57.11.3392	3.9 kOhm	1%, 0.25W , MF
J.....3	54.12.0403	Socket 3-pole				R.....58	57.11.3152	1.5 kOhm	1%, 0.25W , MF
J.....4	54.21.2201	XLR-Socket 3-pole				R.....59	57.11.3152	1.5 kOhm	1%, 0.25W , MF
J.....5	54.21.2201	XLR-Socket 3-pole				R.....60	57.11.3272	2.7 kOhm	1%, 0.25W , MF
J.....6	54.20.2001	DIN-Socket 6-pole				R.....61	57.11.3561	560 Ohm	1%, 0.25W , MF
JS.....1	54.01.0021	Jumper				R.....62	57.11.3272	2.7 kOhm	1%, 0.25W , MF
JS.....2	54.01.0021	Jumper				R.....63	57.11.3104	100 kOhm	1%, 0.25W , MF
L.....1	62.02.3479	4.7 uH	HF-Choke			R.....64	57.11.3102	1 kOhm	1%, 0.25W , MF
MP.....1	1.721.761.11	In-Out PCB				R.....65	57.11.3104	100 kOhm	1%, 0.25W , MF
MP.....2	1.726.780.01	2 pcs	Holder			R.....66	57.11.3102	1 kOhm	1%, 0.25W , MF
MP.....3	28.21.2405	2 pcs	Tubular Rivet			R.....68	57.11.3302	3 kOhm	1%, 0.25W , MF
MP.....4	20.21.7102	4 pcs	Screw 2.2 * 4.5mm			R.....69	57.11.3302	3 kOhm	1%, 0.25W , MF
P.....1	54.01.0020	Contact-Pin				R.....70	55.12.0003	Switch	
P.....2	54.01.0020	Contact-Pin							
P.....3	54.01.0020	Contact-Pin							
P.....4	54.01.0020	Contact-Pin							
P.....5	54.01.0020	Contact-Pin							
P.....6	54.01.0020	Contact-Pin							
P.....7	54.21.2200	XLR-Socket 3-pole							
P.....8	54.21.2200	XLR-Socket 3-pole							
Q.....1	50.03.0350	J 112	N-Channel FET						
Q.....2	50.03.0350	J 112	N-Channel FET						
Q.....3	50.03.0350	J 112	N-Channel FET						
Q.....4	50.03.0350	J 112	N-Channel FET						
R.....1	57.11.3682	6.8 kOhm	1%, 0.25W , MF						
R.....2	57.11.3272	2.7 kOhm	1%, 0.25W , MF						
R.....3	57.11.3104	100 kOhm	1%, 0.25W , MF						
R.....4	57.11.3105	1 MOhm	1%, 0.25W , MF						

END

EL=Electrolytic, CER=Ceramic, PETP=Polyester, SI=Silicon, MF=Metalfilm

PP=Polypropilen

Manufacturer: NS=National Semiconductors, TI=Texas Instruments

MOT=Motorola, PH=Philips, ST=Studer, SGT=SGS Thomson

Sig=Signetics

00 PS 91/10/04

1.721.790.00 FRONT UNIT C115 ESE

Ad ...Pos... Ref.No... Description

C.....1	59.32.1102	1 nF	10%, 50V, CER		R....30	57.11.3223	22 kOhm	2%, 0.25W, MF
C.....2	59.22.8479	4.7 uF	-20%, 50V, EL		R....31	57.11.3102	1 kOhm	2%, 0.25W, MF
C.....3	59.22.8479	4.7 uF	-20%, 50V, EL		R....32	57.11.3102	1 kOhm	2%, 0.25W, MF
C.....4	59.22.8229	2.2 uF	-20%, 25V, EL		R....33	57.11.3102	1 kOhm	2%, 0.25W, MF
C.....5	59.22.8479	4.7 uF	-20%, 25V, EL		R....34	57.11.3102	1 kOhm	2%, 0.25W, MF
C.....6	59.22.4221	220 uF	-20%, 16V, EL		R....35	57.11.3223	22 kOhm	2%, 0.25W, MF
C.....7	59.06.0152	1.5 nF	10%, 25V, PETP		R....36	57.11.3223	22 kOhm	2%, 0.25W, MF
C.....8	59.34.5561	560 pF	10%, 50V, CER		R....37	57.11.3682	6.8 kOhm	2%, 0.25W, MF
C.....9	59.34.5561	560 pF	10%, 50V, CER		R....38	57.11.3473	47 kOhm	2%, 0.25W, MF
C....10	59.22.8229	2.2 uF	-20%, 25V, EL		R....39	57.11.3473	47 kOhm	2%, 0.25W, MF
D.....1	50.04.0125		IN 4448		R....40	57.11.3473	47 kOhm	2%, 0.25W, MF
D.....2	50.04.0125		IN 4448		R....41	57.11.3473	47 kOhm	2%, 0.25W, MF
DL....1	50.04.2702		MV 53123, LED yellow		R....42	57.11.3102	1 kOhm	2%, 0.25W, MF
DL....2	50.04.2701		MV 57123, LED red		R....43	57.11.3102	1 kOhm	2%, 0.25W, MF
DL....3	50.04.2703		MV 54123, LED green		R....44	57.11.3102	1 kOhm	2%, 0.25W, MF
DV....1	50.04.1145	9.1 V	Z, 5%, 0.50W		R....45	57.11.3102	1 kOhm	2%, 0.25W, MF
IC....1	1.721.490.24		MB 88515B Microprocessor		R....46	57.11.3102	1 kOhm	2%, 0.25W, MF
J....1	1.721.490.06		Jack Flat Cable 17-pole		R....47	57.11.3102	1 kOhm	2%, 0.25W, MF
J....2	1.721.490.06		Jack Flat Cable 17-pole		R....48	57.11.3102	1 kOhm	2%, 0.25W, MF
NP....1	1.721.790.11		FRONT UNIT PCB		R....49	57.11.3102	1 kOhm	2%, 0.25W, MF
NP....2	1.721.490.21		VF-Display		R....50	57.11.3102	1 kOhm	2%, 0.25W, MF
NP....3	1.721.490.22		Display Holder		R....51	57.11.3102	1 kOhm	2%, 0.25W, MF
NP....4	1.721.490.23		Sticker		R....52	57.11.3471	470 Ohm	2%, 0.25W, MF
NP....5	1.721.490.29		Connective Cord 5-pole		R....53	57.11.3102	1 kOhm	2%, 0.25W, MF
NP....6	53.03.0364		IC-Socket 64-pole		R....54	57.11.3222	2.2 kOhm	2%, 0.25W, MF
NP....7	50.20.2799	3 pcs	LED-Holder 1x13.7		R....55	57.11.3471	470 Ohm	2%, 0.25W, MF
Q....1	50.03.0436	BC2378	Small Signal NPN	any	R....56	57.11.3473	47 kOhm	2%, 0.25W, MF
Q....2	50.03.0436	BC2378	Small Signal NPN	any	R....57	57.11.3473	47 kOhm	2%, 0.25W, MF
Q....3	50.03.0515	BC3078	Small Signal PNP	any	R....58	57.11.3222	2.2 kOhm	2%, 0.25W, MF
Q....4	50.03.0436	BC3078	Small Signal NPN	any	R....59	57.11.3222	2.2 kOhm	2%, 0.25W, MF
Q....5	50.03.0515	BC3078	Small Signal PNP	any	R....60	57.11.3222	2.2 kOhm	2%, 0.25W, MF
Q....6	50.03.0436	BC2378	Small Signal NPN	any	R....61	57.11.3223	22 kOhm	2%, 0.25W, MF
Q....7	50.03.0436	BC2378	Small Signal NPN	any	R....62	57.11.3223	22 kOhm	2%, 0.25W, MF
Q....8	50.03.0351	BC327-25	Small Signal PNP		R....63	57.11.3473	47 kOhm	2%, 0.25W, MF
Q....9	50.03.0351	BC327-25	Small Signal PNP		R....64	57.11.3473	47 kOhm	2%, 0.25W, MF
Q....10	50.03.0515	BC3078	Small Signal PNP	any	R....65	57.11.3103	10 kOhm	2%, 0.25W, MF
Q....11	50.03.0436	BC2378	Small Signal NPN	any	R....66	57.11.3103	10 kOhm	2%, 0.25W, MF
Q....12	50.03.0515	BC3078	Small Signal PNP	any	R....67	57.11.3223	22 kOhm	2%, 0.25W, MF
Q....13	50.03.0436	BC2378	Small Signal NPN	any	R....68	57.11.3222	2.2 kOhm	2%, 0.25W, MF
Q....14	50.03.0436	BC2378	Small Signal NPN	any	R....69	57.11.3683	68 kOhm	2%, 0.25W, MF
Q....15	50.03.0515	BC3078	Small Signal PNP	any	R....70	57.11.3683	68 kOhm	2%, 0.25W, MF
R....1	57.11.3223	22 kOhm	2%, 0.25W, MF		RZ....1	57.88.4473	47 kOhm	2%, 8*0.125W
R....2	57.11.3223	22 kOhm	2%, 0.25W, MF		RZ....2	57.88.4473	47 kOhm	2%, 8*0.125W
R....3	57.11.3471	470 Ohm	2%, 0.25W, MF		RZ....3	57.88.4473	47 kOhm	2%, 8*0.125W
R....4	57.11.3223	22 kOhm	2%, 0.25W, MF		RZ....4	57.88.4473	47 kOhm	2%, 8*0.125W
R....5	57.11.3223	22 kOhm	2%, 0.25W, MF		S....1	55.99.0158		1*a
R....6	57.11.3222	2.2 kOhm	2%, 0.25W, MF		S....2	55.99.0158		1*a
R....7	57.11.3473	47 kOhm	2%, 0.25W, MF		S....3	55.99.0158		1*a
R....8	57.11.3223	22 kOhm	2%, 0.25W, MF		S....4	55.99.0158		1*a
R....9	57.11.3223	22 kOhm	2%, 0.25W, MF		S....5	55.99.0158		1*a
R....10	57.11.3222	2.2 kOhm	2%, 0.25W, MF		S....6	55.99.0158		1*a
R....11	57.11.3223	22 kOhm	2%, 0.25W, MF		S....7	55.99.0158		1*a
R....12	57.11.3471	470 Ohm	2%, 0.25W, MF		S....8	55.99.0158		1*a
R....13	57.11.3471	470 Ohm	2%, 0.25W, MF		S....9	55.99.0158		1*a
R....14	57.11.3223	22 kOhm	2%, 0.25W, MF		S....10	1.721.790.05		2*u
R....15	57.11.3103	10 kOhm	2%, 0.25W, MF		S....11	1.721.790.05		2*u
R....16	57.11.3103	10 kOhm	2%, 0.25W, MF		S....12	1.721.790.05		2*u
R....17	57.11.3103	10 kOhm	2%, 0.25W, MF		S....13	55.99.0158		1*a
R....18	57.11.3103	10 kOhm	2%, 0.25W, MF		S....14	55.99.0158		1*a
R....19	57.11.3473	47 kOhm	2%, 0.25W, MF		S....15	55.99.0158		1*a
R....20	57.11.3222	2.2 kOhm	2%, 0.25W, MF		S....16	55.99.0158		1*a
R....21	57.11.3105	1 MOhm	2%, 0.25W, MF		W....5	1.721.790.94	Flat Cable	
R....22	57.11.3222	2.2 kOhm	2%, 0.25W, MF		Y....1	1.721.490.25	CERAMIC OSCILLATOR 6.0 MHz	
R....23	57.11.3222	2.2 kOhm	2%, 0.25W, MF					
R....24	57.11.3103	10 kOhm	2%, 0.25W, MF					
R....25	57.11.3103	10 kOhm	2%, 0.25W, MF					
R....26	57.11.3102	1 kOhm	2%, 0.25W, MF					
R....27	57.11.3102	1 kOhm	2%, 0.25W, MF					
R....28	57.11.3473	47 kOhm	2%, 0.25W, MF					
R....29	57.11.3223	22 kOhm	2%, 0.25W, MF					

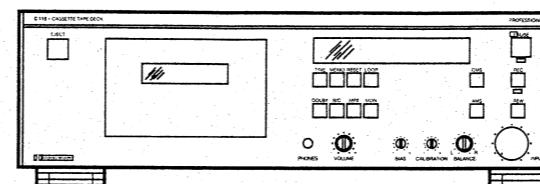
00 PS 91/10/04

EL=Electrolytic, CER=Ceramic, PETP=Polyester, SI=Silicon, MF=Metalfilm

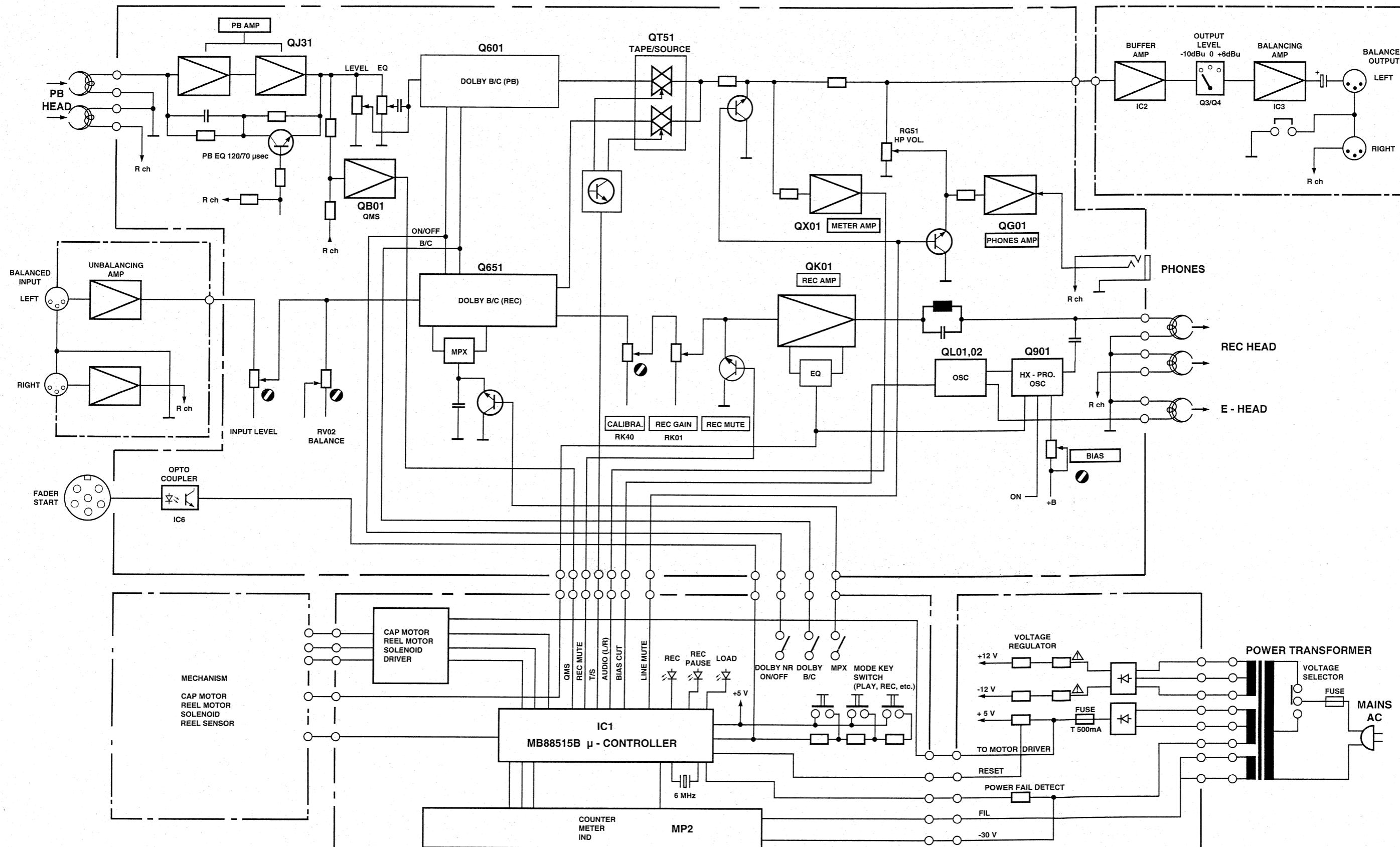
Manufacturer: NS-National Semiconductors, TI-Texas Instruments
MO-Motorola, PH-Philips, ST-Studer, SGT-SGS Thomson

REVOX C115

PROFESSIONAL CASSETTE TAPE DECK



SCHEMATIC DIAGRAM
BLOCK DIAGRAM
CONNECTION DIAGRAM
PARTS LOCATION (Components Side)



Connection Diagram

Parts Location (Components Side)

(Components Side)

